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Limerick · Trondheim · Alba Iulia · Písek · Sestao · Smolyan · Vöru

Co-Creation of Positive Energy Blocks

1st NordicZEB+ Conference 2019 | 07.11.2019

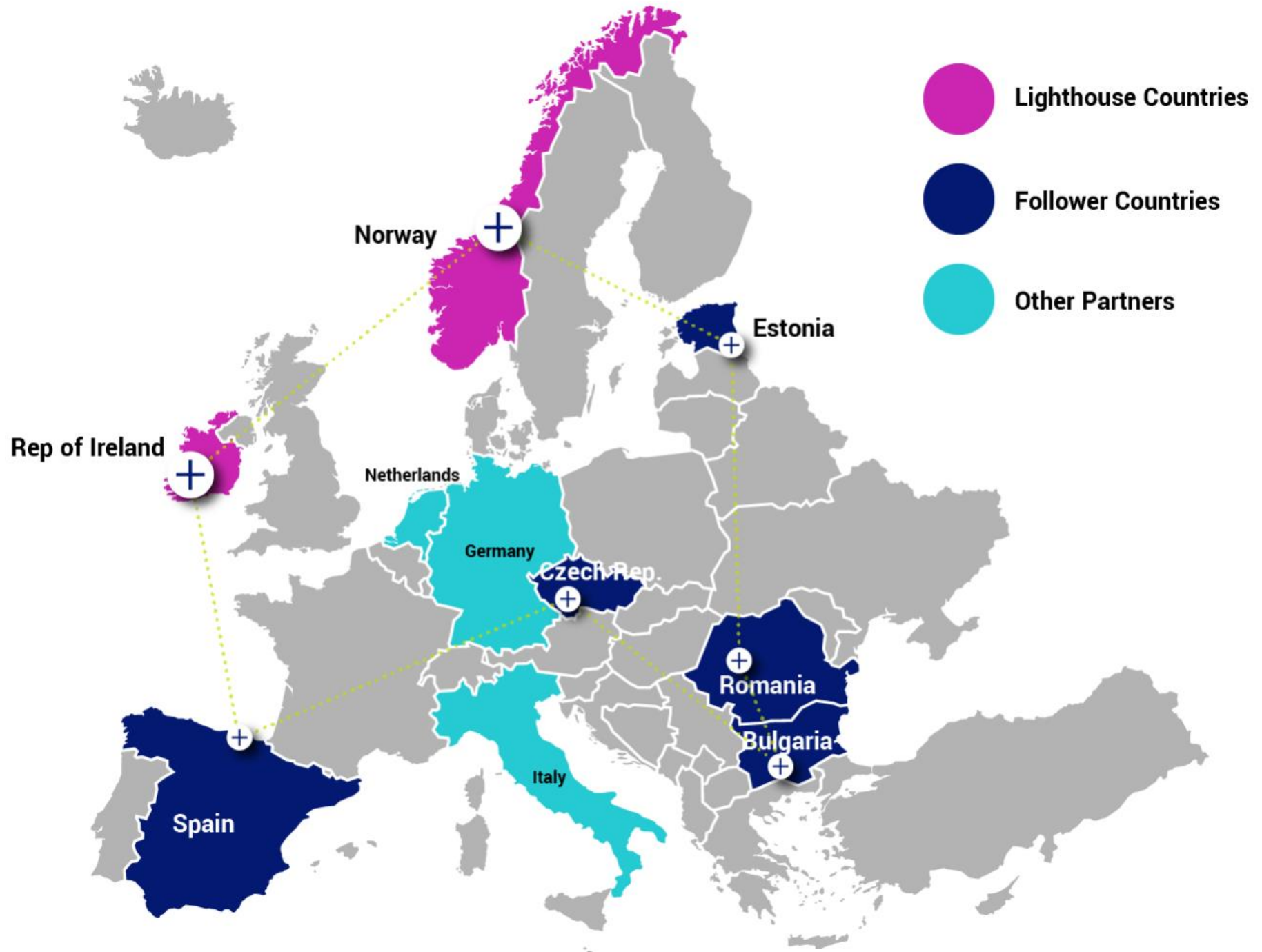
Dirk Ahlers | Patrick Driscoll | Håvard Wibe | Annemie
Wyckmans (NTNU)

<http://cityxchange.eu/>



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824260.

Cities



Co-creating a project

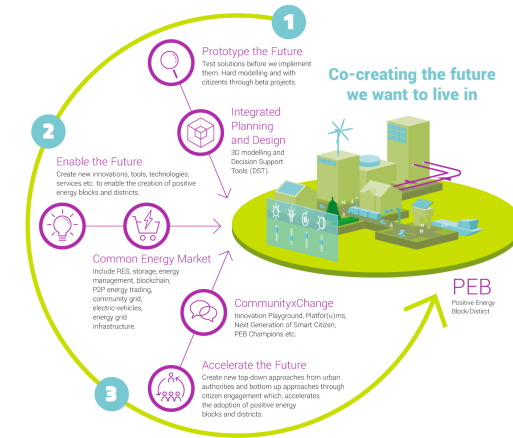
Consortium building and preparation with 32 partners



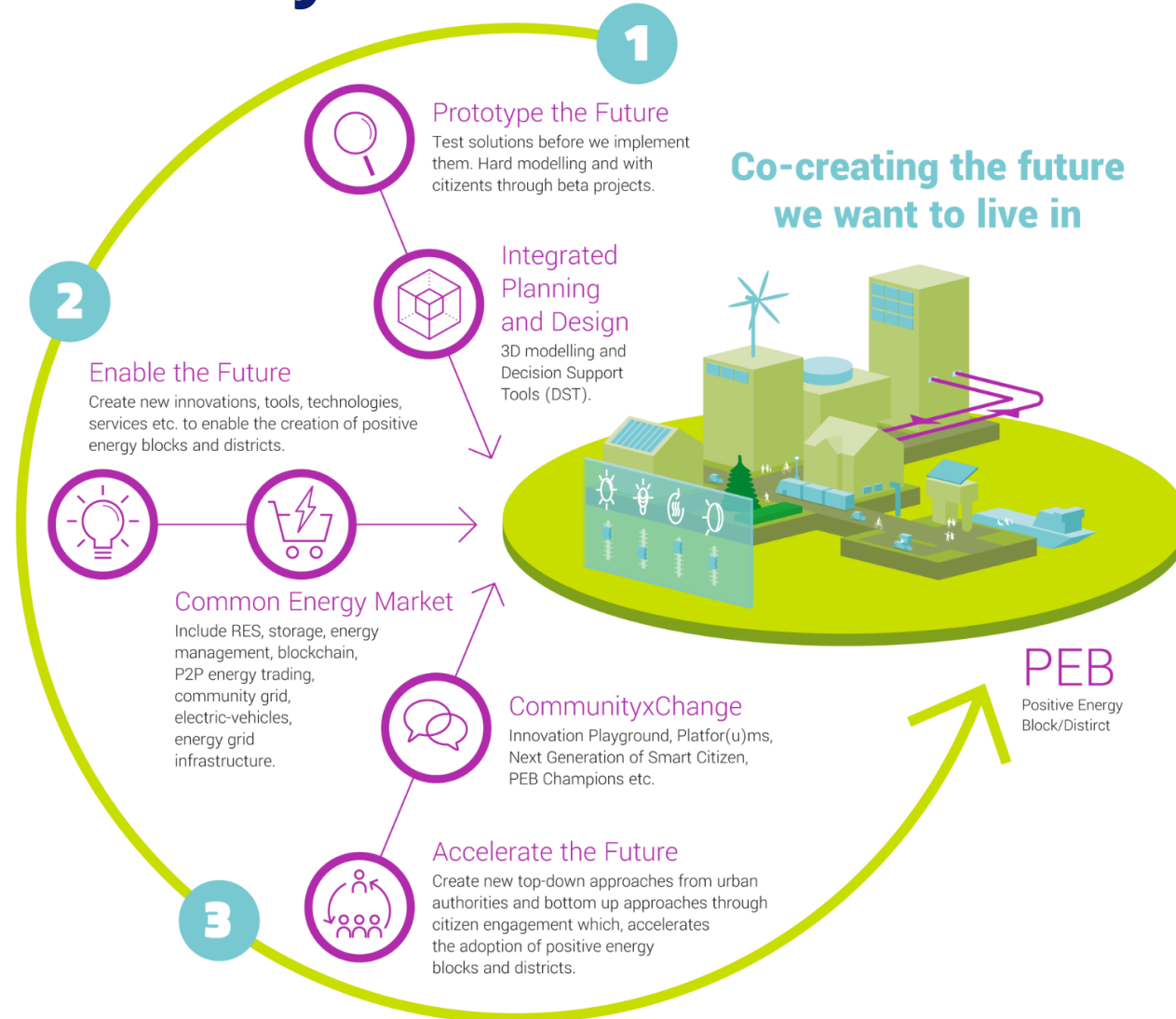
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Objectives: Positive Energy Blocks and Districts (PEBs/PEDs)

- Multiple buildings (new and/or retrofitted)
- Active management of energy consumption and flow
- Annual positive energy balance
- Exchange of energy within and with the outside system
- Optimal use of RES, storage, smart grid, demand-response, user interaction, ICT
- Integrated and scalable design
- Part of the clean energy transition

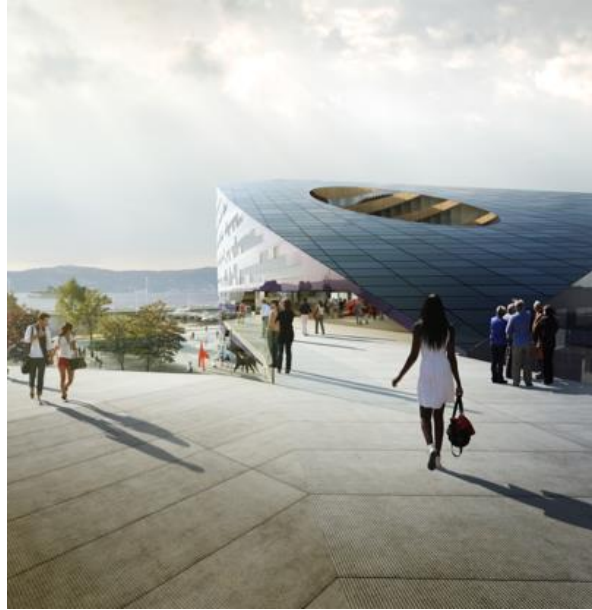


Co-Creation and City-Driven Transition to PEBs/PEDs



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Starting from hubs



Powerhouse Brattøra,
Trondheim
[www.powerhouse.no]



Lysgården, Sluppen,
Trondheim
[www.lysgarden.no]



Calle Txabarri, Sestao
[www.sestaoberri.eus]



Gardens International, Limerick
[www.limerick.ie]

Co-Creation and Open Innovation

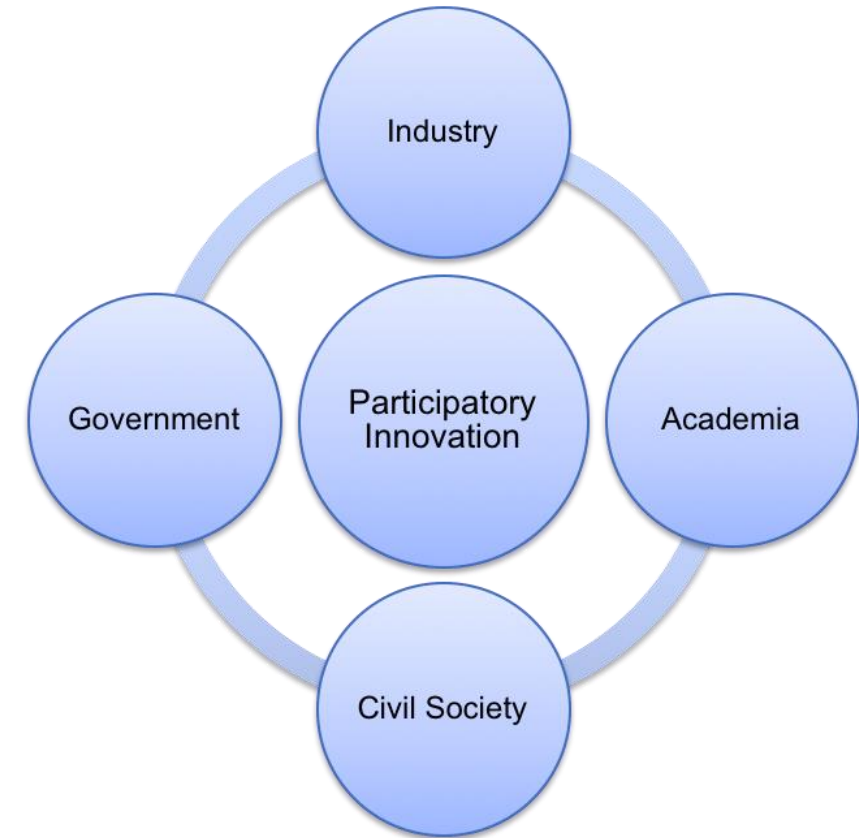
- Citizen participation, outreach, open data and systems
- “Open by Default”
- Co-creation: cities + universities + solution providers + citizens; new frameworks and methodologies
- “Next Generation Smart Citizen”
- Creating Innovation Spaces (SCC project office + Smart City + UniversityCity + Citizen Observatory + Innovation Playgrounds + City as a living lab)



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Quadruple Helix Innovation Model

- Method used in Innovation, Urban Planning/Development, Citizen engagement
- Co-Creation and Open Innovation
- Involvement and collaboration of relevant actors
- Structural changes beyond any one segment
- Involvement of all stakeholders in urban innovation, knowledge sharing, collaboration



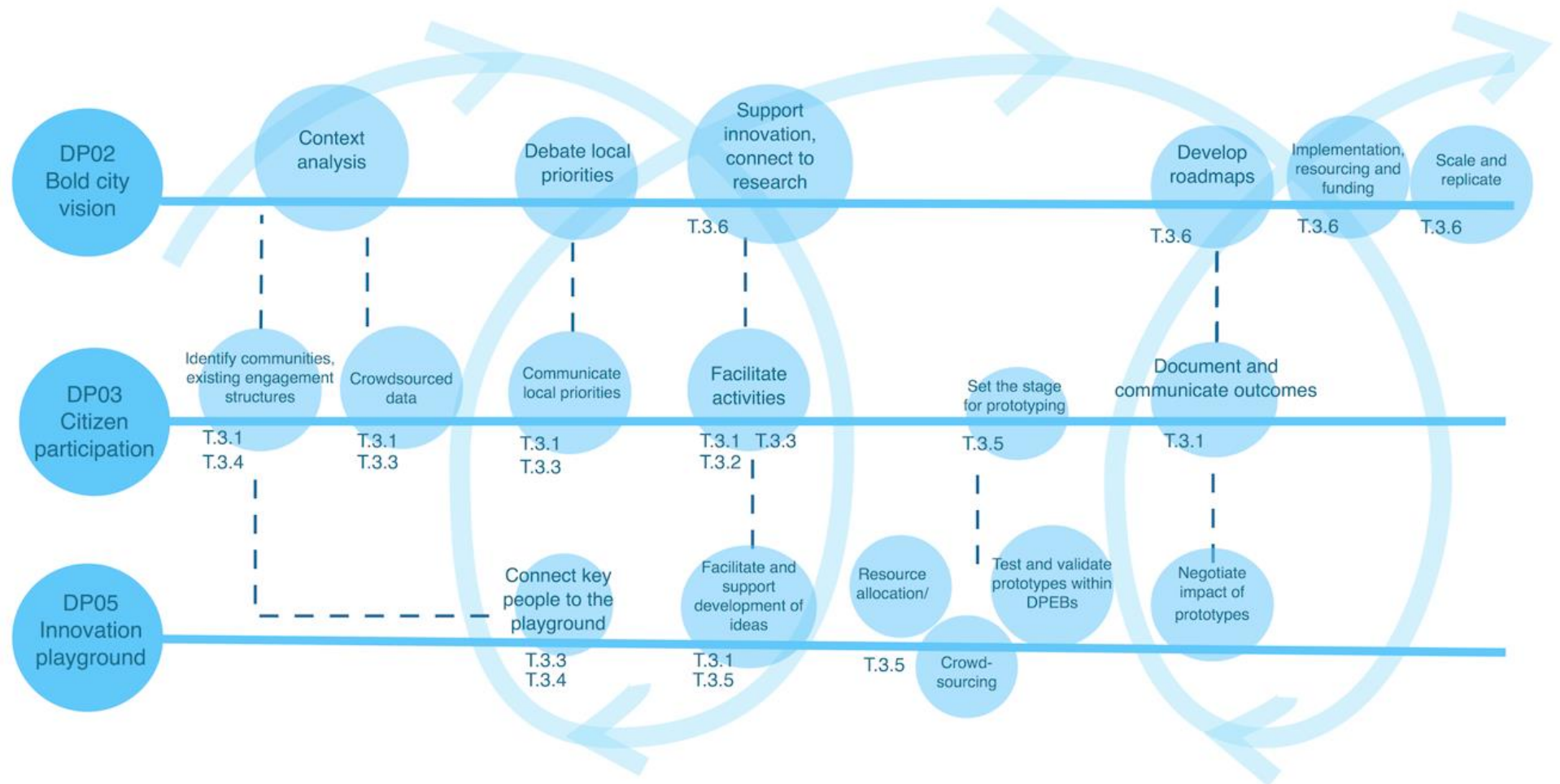
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The +CityxChange vision is to enable the co-creation
of the future we want to live in

POSITIVE CITY EXCHANGE

+Trondheim +Limerick +Sestao +Alba Iulia +Pisek +Võru +Smolyan

Citizen Participation Processes



Positive Energy Districts

The Implementation Plan of the Smart Cities
Working Group of the European SET-Plan



URBAN EUROPE

bmvft

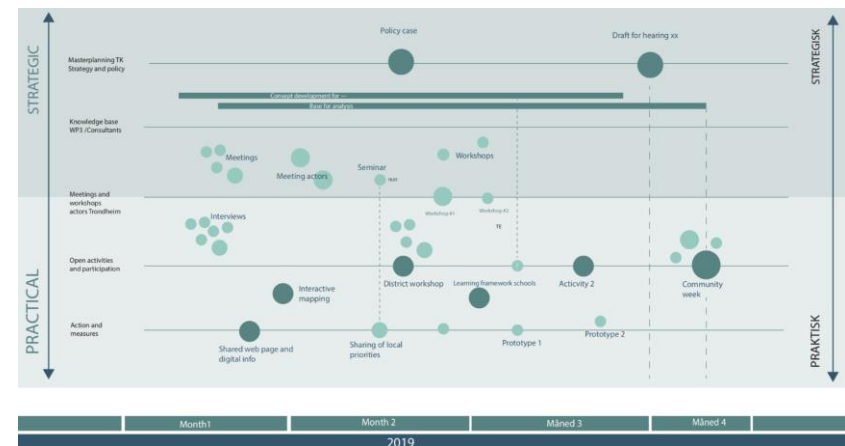
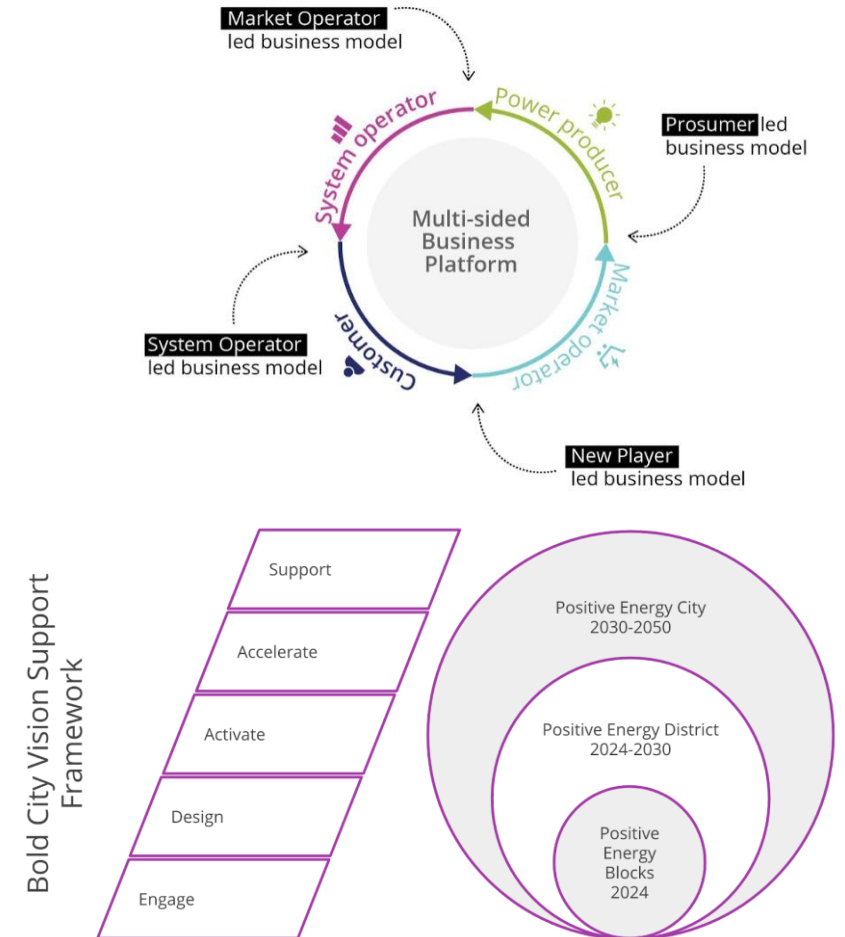
*“Enhance capacities of cities, industry and research to make Europe a global role model and market leader in technology integration for and deployment of **Positive Energy Districts** taking into account aspects of inclusiveness with the aim **by 2025** to have at least **100 successful Positive Energy Districts** synergistically connected to the energy system in Europe and with a strong export of related technologies.”*

SET Plan Steering Group Meeting, June 13 2018, Brussels,
by Hans-Günther SCHWARZ, Austrian Ministry for Transport, Innovation and Technology

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Achievements so far

- Started one of the first large-scale projects on Positive Energy Districts
- Frameworks developing
 - Bold City Vision strategies
 - Engagement methods
 - Operational PEB definition
- Citizen Observatories
- Workshops
- Open Collaboration



Q&A

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Co-Creation of Positive Energy Blocks

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Abstract.

A main challenge in building carbon-neutral built environments is the ability to scale and replicate solutions. We examine how to develop low-carbon neighbourhoods and districts, while aiming at climate-friendly and sustainable livable urban environments. We take a view that not only scales up individual building solutions, but embraces the added complexity arising from the scale change and utilizes them for a novel approach. It includes a strong focus on co-creation and open innovation to develop sustainable solutions.

In this contribution, we present the approach of the +CityXChange project in implementing Positive Energy Blocks (PEB) through a European H2020 project in the topic of Smart Cities and Communities. A PEB comprises several connected buildings that have an averaged yearly positive energy balance between them. This definition excludes embodied emissions, but allows to focus on the infrastructure and systems between buildings as part of the built environment, and ways to implement and incorporate them within existing cities. The +CityXChange approach relies on co-creating Europe-wide deployment of Positive Energy Districts, with Integrated Planning and Design, Creation of a Common Energy Market, and CommunityChange with all stakeholders of the city.

1. Introduction

A main challenge in carbon-neutral built environments is the ability to involve all stakeholders for sufficient buy-in and contributions to ensure well-aligned development and uptake of agreed solutions. The challenge goes hand in hand with the ability to scale up and replicate solutions out of successful small pilot deployments to become part of larger city developments. In short, successful design, development, and roll-out of smart city solutions requires cooperation of all involved stakeholders, for which we follow a quadruple helix ecosystem model. We follow this approach with a strong focus on cross-disciplinary collaboration and a co-creation approach that strongly includes cities and citizens.

In this contribution, we present the approach of the +CityXChange project in implementing Positive Energy Blocks (PEB) through a European H2020 project in the topic of Smart Cities and Communities. A PEB is a local neighbourhood-level implementation and is understood as a collection of at least 3 buildings in close proximity that have an averaged yearly positive energy balance between them achieved through a range of measures discussed in detail below. PEBs are supposed to be scaled up subsequently to net-Positive Energy Districts. The definition of PEBs so far excludes embodied emissions, but allows to focus on the infrastructure and systems between buildings as part of the built environment, and ways to implement and incorporate

Demo Projects: Technology

ENVIRONMENTAL



Model (DP01)

Record data and provide integrated decision support to cities

SPATIAL



DPEB (DP06)

Create DPEBs through improved energy performance and integration with the energy system

TECHNICAL



Microgrids (DP07)

Balance and optimise energy in the PEB through Microgrids

TECHNICAL



EMaaS (DP08)

Integrate seamless e-mobility within the PEB

TECHNICAL



Local trading (DP09)

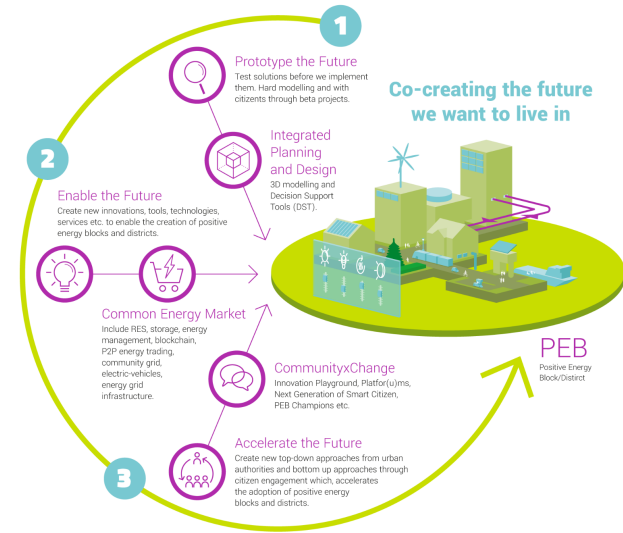
Enable Peer-to-Peer trading within the PEB

TECHNICAL

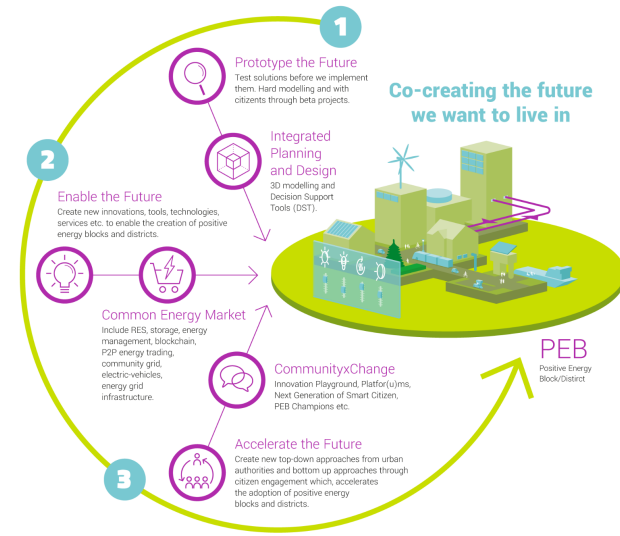


Flexibility market (DP10)

Enable a fair deal to all consumers through a flexibility market



Demo Projects: Community Engagement and Scaling



SOCIAL



Engage (DP03)
Co-create Positive Energy Blocks

SOCIAL



Vision (DP02)
Co-create a Bold City Vision, to Plan, Implement, Replicate and Scale-up to Positive Energy Districts and Cities

LEGAL



Regulatory zone (DP04)
Enable innovation through regulation mechanisms

ECONOMIC



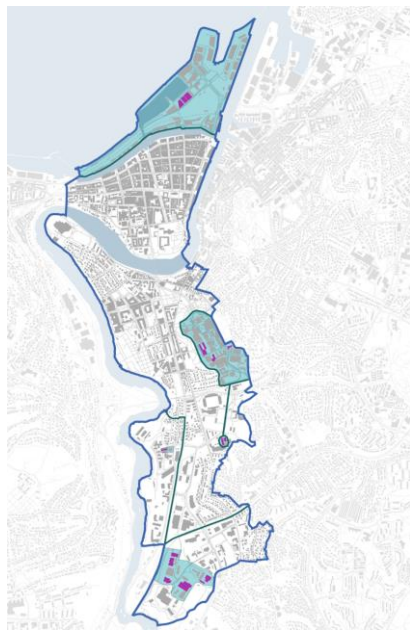
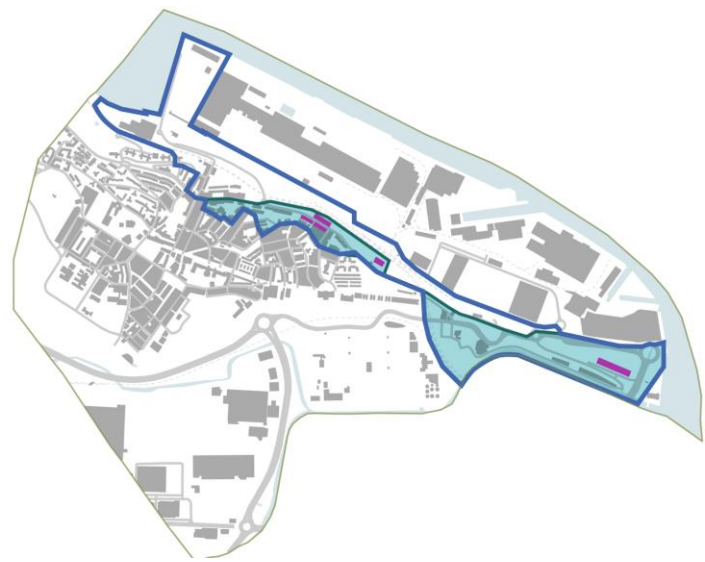
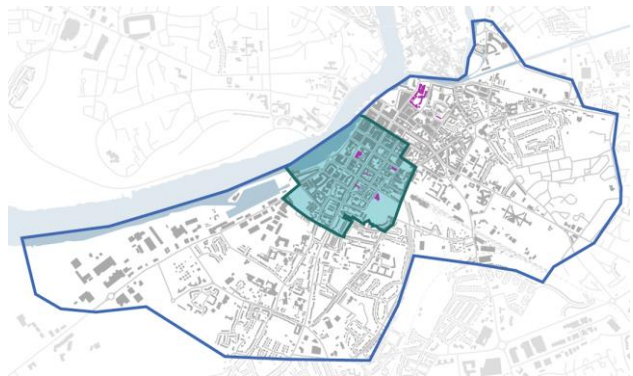
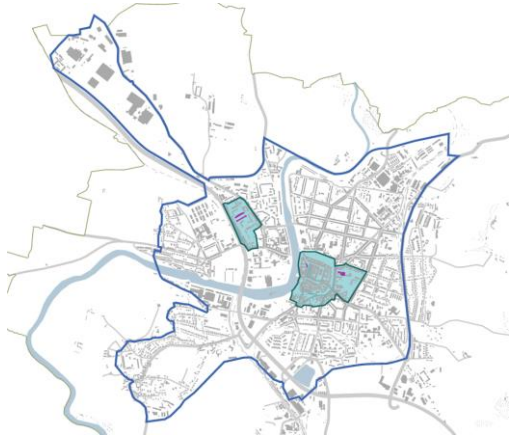
Invest (DP11)
Enable consumers to invest in their buildings, which is critical to the creation of a PEB

SOCIAL



Playground (DP05)
Accelerate change and disruptive solutions through innovation playgrounds

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City-Driven System Transition towards PEBs/PEDs

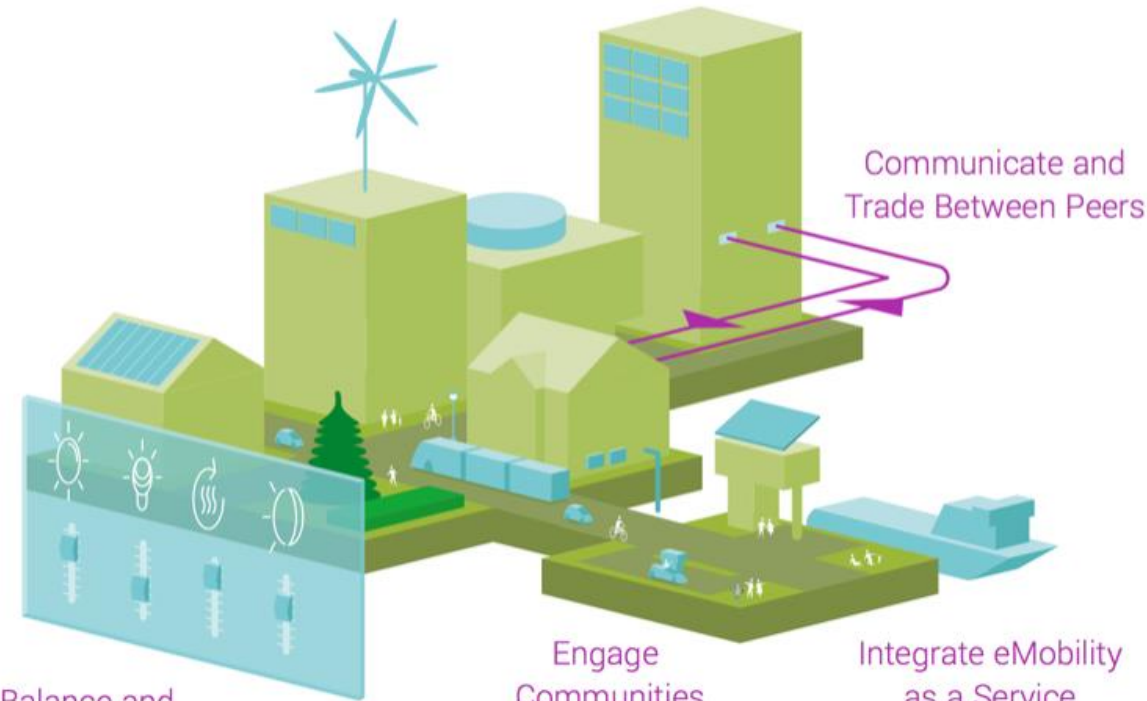
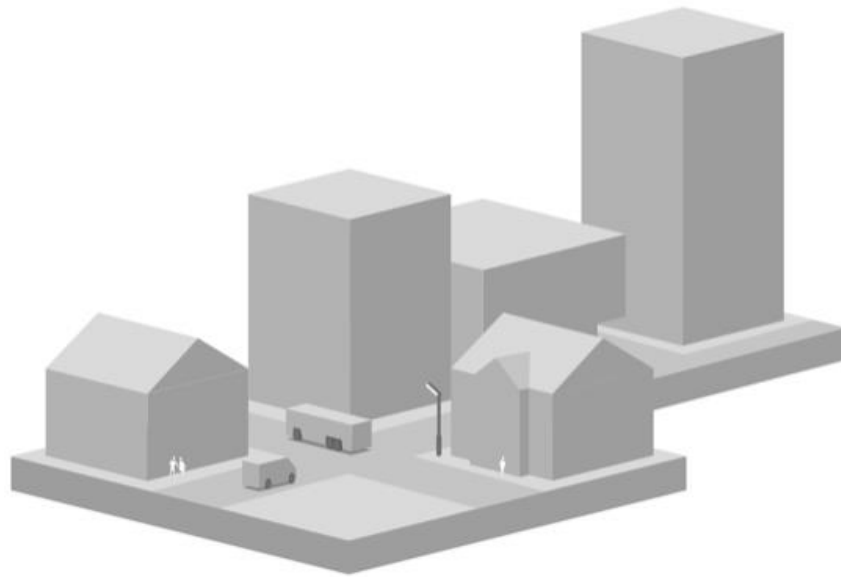
Existing Building Stock



Accelerating the Clean Energy Transition



Positive Energy Block/District (PEB)

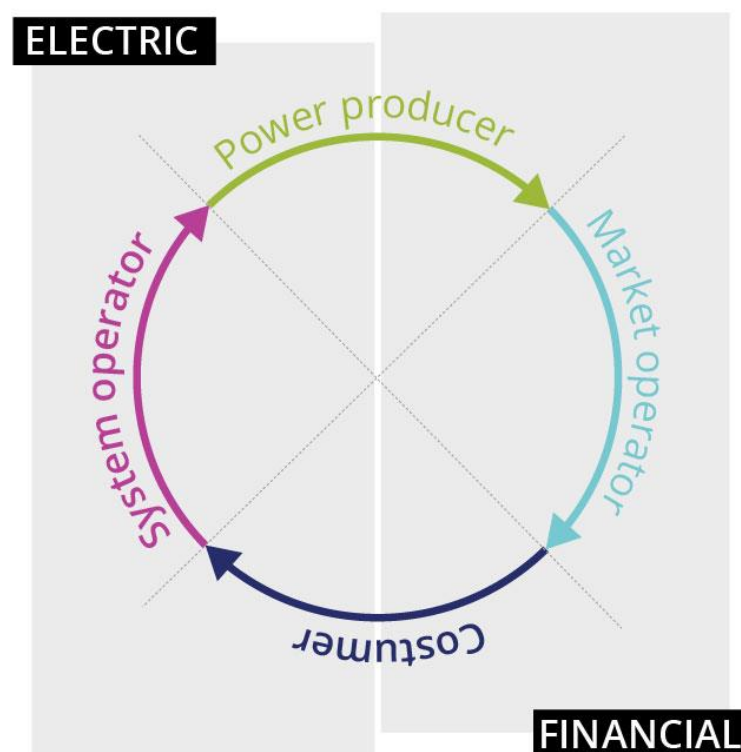
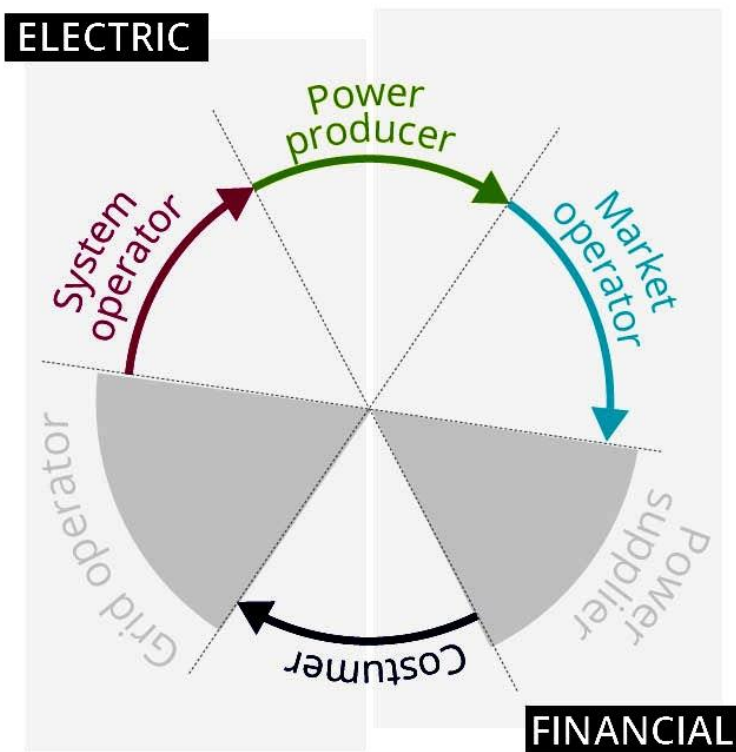


Balance and Optimise Energy across the PEB



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The new energy market



From six to four roles

One player - two roles
-> producer/costumer

Digital data exchange and automatic operation

Market operation - executed by transparent and neutral role(s)

Local system operation includes local grid operation - micro or cit grid

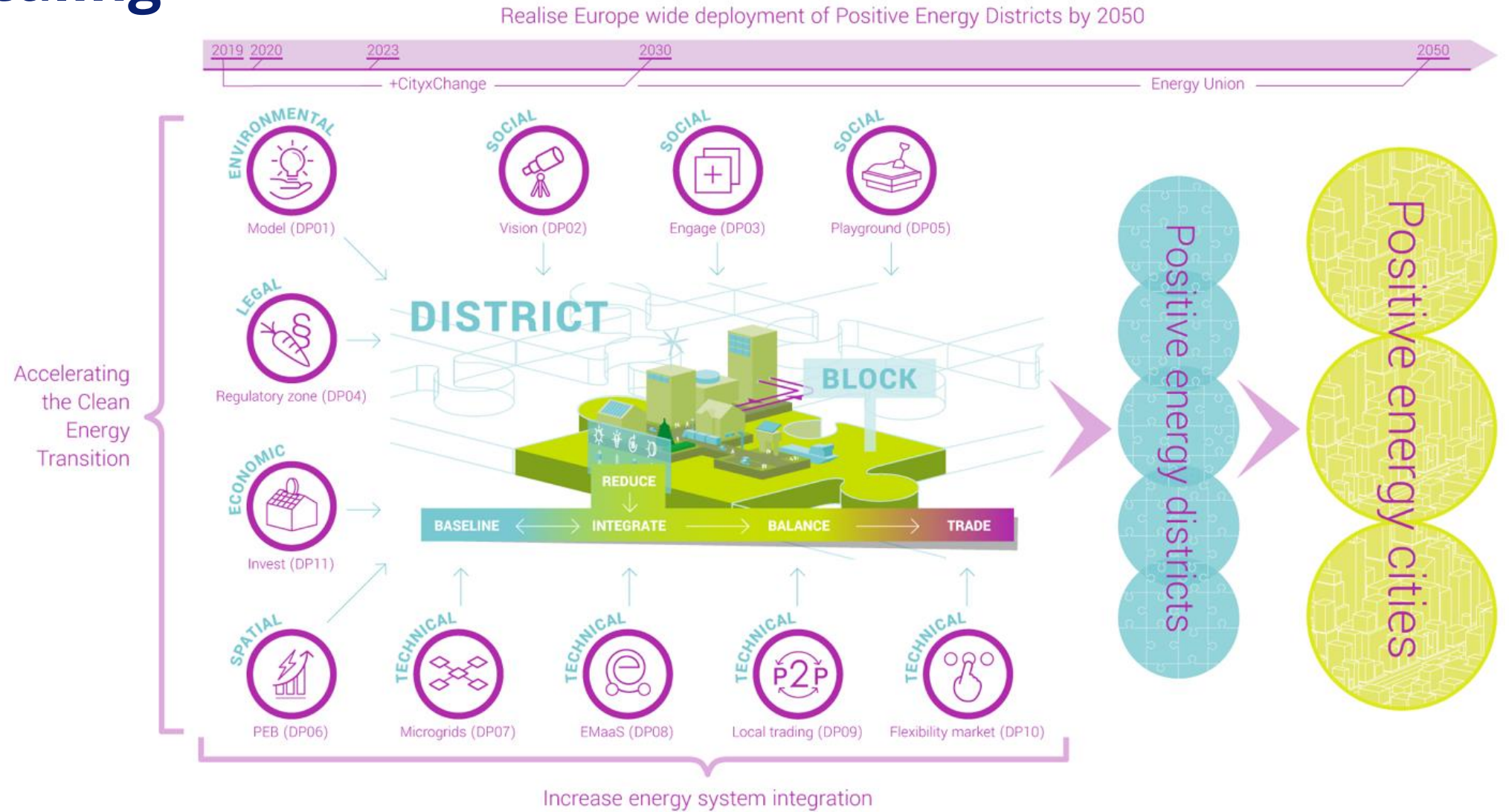
Market operation requires digital interactions between roles

Local market may be connected to global pricing

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Source:
+CxC [D2.1 Report on Regulatory Mechanism to Trial Innovation in Cities](#)

Scaling



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